What is claimed is:

1. A method of manufacturing a soot preform comprising:
heating a soot preform to a temperature of less than about 1000 °C; and
exposing the preform to a substantially halide free reducing agent.

2. The method according to claim 1 wherein the reducing agent comprises carbon monoxide.

3. The method according to claim 1 further comprising forming the soot body by depositing soot on a starting member, the soot comprises silica and at least one component selected from the group consisting of alkali metal oxides, alkaline earth oxides, transition metals, alumina, antimony oxide, boron oxide, gallium oxide, indium oxide, germanium oxide, tin oxide, lead oxide, phosphorus oxide, arsenic oxide, bismuth oxide, tellurium oxide, and selenium oxide, titanium oxide, and mixtures thereof.

4. The method according to claim 1 wherein the temperature of said heating step comprises no more than about 800 °C.

5. The method according to claim 4 wherein the temperature comprises no more than about 400 °C.

6. The method according to claim 1 further comprising sintering the soot preform.

7. The method of claim 1 wherein the reducing agent comprises a compound that will preferentially react with an oxide having the formula:

$$M_xO_y$$

wherein "M" is at least one element selected from following group of elements consisting of elements having atomic numbers 21-30, elements having atomic numbers

39-48, elements having atomic numbers 57-79, elements having atomic numbers 89-107, and mixtures thereof, "O" is oxygen, and "x" and "y" are integers greater than 0.

8. The method according to claim 7 wherein said exposing step comprises a reaction between the reducing agent and the oxide with a reaction product which comprises a carbonyl complex.

9. The method according to claim 8 further comprising volatizing off the carbonyl complex.

10. The method of claim 9 further comprising forming the preform into a chlorine free photomask plate.

11. The method of claim 7 wherein "M" is at least one element selected from the group consisting of Zr, Ni, Fe, Ti, V, Cr, Mn, Co, Cu, Zn, and mixtures thereof.

12. The method of claim 1 further comprising doping the preform with fluorine.

13. The method according to claim 1 further comprising depositing soot that has been doped with at least one element selected from the group consisting of Sb, Al, B, Ga, In, Ti, Ge, Sn, Pb, P, As, Bi, Te, Se, and mixtures thereof onto a starting member to form the soot preform.

14. A photomask plate made in accordance with claim 1.

15. The photomask plate according to claim 14 wherein the plate comprises a chlorine free plate.

16. A method of making an optical fiber preform comprising:

exposing a soot preform, in a furnace, to a substantially non-chlorine containing atmosphere comprising carbon monoxide; and

heating the soot preform to a temperature of at least about 1000°C.

17. The method of claim 16 wherein the atmosphere comprises at least about 100 ppm of carbon monoxide.

18. The method according to claim 17 wherein the atmosphere comprises less than about 3000 ppm of carbon monoxide.

19. The method according to claim 16 wherein the temperature comprises at least about 1200 °C.

20. The method of claim 16 wherein the soot body comprises at least one region of germanium doped soot.

21. The method of claim 16 further comprising treating the preform with a chlorine containing atmosphere.

22. The method according to claim 20 further comprising sintering the preform.

23. The method according to claim 22 further comprising drawing the sintered preform into an optical fiber.

24. An optical fiber made in accordance with claim 16.

25. The optical fiber according to claim 24 wherein said fiber comprises a non-zero dispersion shifted optical fiber.

26. A method of making an optical fiber comprising:
doping a soot body with fluorine; and
exposing the fluorine doped soot body to a substantially chlorine free atmosphere comprising at least carbon monoxide at a temperature of at least 1100°C, thereby reacting excess oxygen present.

27. The method according to claim 26 wherein the temperature comprises at least 1300°C.

28. The method according to claim 26 further comprising depositing germanium doped silica soot on a starting member to form the soot body wherein the soot body has at least one germanium doped region.

29. The method according to claim 26 further comprising drying the preform in a drying atmosphere comprising at least one chlorine containing compound prior to said exposing.

30. The method according to claim 29 wherein said chlorine containing compound is at least one compound selected from the group consisting of Cl_2, $GeCl_4$, and mixtures thereof.

31. The method according to claim 26 wherein a concentration of CO in the atmosphere during said exposure is on the same order of magnitude as a concentration of fluorine in a doping atmosphere of said doping step.

32. A method of making an optical fiber comprising:

exposing a soot body to a substantially chlorine free atmosphere comprising at least carbon monoxide and a fluorine containing compound at a temperature of at least 1100°C, thereby reacting excess oxygen present.

33. The method according to claim 32 wherein the temperature comprises at least 1300°C.

34. The method according to claim 32 further comprising depositing germanium doped silica soot on a starting member to form the soot body wherein the soot body has at least one germanium doped region.

35. The method according to claim 32 further comprising drying the preform in a drying atmosphere comprising at least one chlorine containing compound prior to said exposing.

36. A method of making an optical fiber preform comprising:
doping a soot body in an atmosphere comprising carbon monoxide and at least one fluorine containing compound having the general formula C_nF_{2n+2}, wherein "n" is a positive whole number.

37. The method according to claim 36 further comprising exposing the soot body to a substantially halide free atmosphere containing carbon monoxide.

38. The method according to claim 37 wherein said exposing atmosphere further comprises an inert material and a ratio of carbon monoxide to the inert material comprises more than about 0.0012.

39. The method according to claim 38 wherein said ratio comprises no more than about 0.48

40. The method according to claim 36 wherein a concentration of carbon monoxide in the atmosphere during said exposing step comprises at least 300 ppm.

41. The method according to claim 37 wherein a concentration of carbon monoxide in the atmosphere during said exposing step comprises up to about 4800 ppm.

42. The method according to claim 36 further comprising sintering the soot body in atmosphere comprising carbon monoxide.

43. The method according to claim 37 further comprising sintering the soot body in atmosphere comprising carbon monoxide.

44. The method according to claim 42 further comprising drawing the preform into an optical fiber, wherein the fiber exhibits an attenuation spectrum in which the attenuation exhibited by the fiber does not deviate by more than about 0.012 dB/km over a range of wavelengths between about 1565 nm to about 1595 nm.

45. The method according to claim 44 wherein the range of wavelengths comprises between about 1570 nm to about 1590 nm.

46. The method according to claim 44 wherein the deviation in attenuation comprises no more than about 0.06 dB/km.

47. The method according to claim 44 wherein the fiber exhibits an attenuation spectrum in which the attenuation exhibited by the fiber does not deviate by more than about 0.012 dB/km over at least one additional range of wavelengths selected from the ranges of wavelengths between about 1400 nm to about 1470 nm, about 1536 nm to about 1556 nm, and about 1600 nm to about 1620 nm.

48. The method according to claim 47 wherein the deviation in attenuation comprises no more than about 0.06 dB/km.

49. The method according to claim 16 further comprising doping a soot body in an atmosphere comprising carbon monoxide and at least one fluorine containing compound have the general formula C_nF_{2n+2}, wherein “n” is a positive whole number.

50. The method according to claim 49 wherein said exposing atmosphere further comprises an inert material and a ratio of carbon monoxide to the inert material comprises more than about 0.0012.

51. The method according to claim 50 wherein said ratio comprises no more than about 0.48

52. The method according to claim 49 wherein a concentration of carbon monoxide in the atmosphere during said exposing step comprises at least 300 ppm.

53. The method according to claim 49 wherein a concentration of carbon monoxide in the atmosphere during said exposing step comprises up to about 4800 ppm.

54. The method according to claim 49 further comprising sintering the soot body in atmosphere comprising carbon monoxide.

55. The method according to claim 16 further comprising sintering the soot body in atmosphere comprising carbon monoxide.

56. The method according to claim 16 further comprising drawing the preform into an optical fiber, wherein the fiber exhibits an attenuation spectrum in which the attenuation exhibited by the fiber does not deviate by more than about 0.012 dB/km over a range of wavelengths between about 1565 nm to about 1595 nm.

57. The method according to claim 56 wherein the range of wavelengths comprises about 1570 nm to about 1590 nm.

58. The method according to claim 56 wherein the deviation in attenuation comprises no more than about 0.06 dB/km.

59. The method according to claim 56 wherein the fiber exhibits an attenuation spectrum in which the attenuation exhibited by the fiber does not deviate by more than about 0.012 dB/km over at least one additional range of wavelengths selected from the ranges of wavelengths between about 1400 nm to about 1470 nm, about 1536 nm to about 1556 nm, and about 1600 nm to about 1620 nm.

60. The method according to claim 59 wherein the deviation in attenuation comprises no more than about 0.06 dB/km.

61. An optical fiber made in accordance with claim 36.

62. An optical fiber made in accordance with claim 49.

63. The method according to claim 36 further comprising drawing the preform into an optical fiber, wherein the fiber exhibits an attenuation spectrum that has a root mean

square of about 0.009 or less over a range of wavelengths between about 1565 nm to about 1595 nm.

64. The method according to claim 63 wherein said root mean square comprises less than about 0.0088.

65. The method according to claim 63 wherein the fiber exhibits an attenuation spectrum in which the attenuation exhibited by the fiber that has a root mean square of about 0.009 or less at least one range of wavelengths selected from a group of ranges of wavelengths between about 1400 nm to about 1470 nm, about 1536 nm to about 1556 nm, and about 1600 nm to about 1620 nm.

66. The method according to claim 16 further comprising drawing the preform into an optical fiber, wherein the fiber exhibits an attenuation spectrum that has a root mean square of about 0.009 or less over a range of wavelengths between about 1565 nm to about 1595 nm.

67. The method according to claim 66 wherein said root mean square comprises less than about 0.0088.

68. The method according to claim 66 wherein the fiber exhibits an attenuation spectrum in which the attenuation exhibited by the fiber that has a root mean square of about 0.009 or less at least one range of wavelengths selected from a group of ranges of wavelengths between about 1400 nm to about 1470 nm, about 1536 nm to about 1556 nm, and about 1600 nm to about 1620 nm.